

REMARKS

This paper is filed in response to the office action mailed on August 10, 2004. Claims 2 and 3 have been amended; claim 9 has been canceled; claims 1-8 and 10-19 are pending.

Regarding the amendment to claims 2 and 3, applicant refers to the examiner to paragraph beginning on page 4, line 15 of the application as filed. In that passage, it states that R of the alkyl ammonium salt may be C<sub>1</sub> and C<sub>16</sub> when the alkyl ammonium salt is cetyltrimethylammoniumchloride. This passage also indicates that R may be C<sub>1</sub>, C<sub>2</sub> and C<sub>12</sub> when the alkyl ammonium salt is dodecylethyldimethylammonium bromide. This passage also indicates that R can be C<sub>2</sub> and C<sub>18</sub> when the alkyl ammonium salt is oleyltriethylammonium bromide. This passage also indicates that R may be C<sub>1</sub> and C<sub>10</sub> when the alkyl ammonium salt is didecyldimethylammonium phosphate.

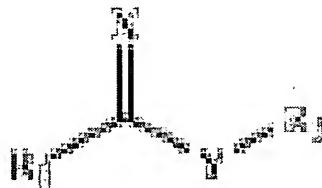
Therefore, applicant respectfully submits that it is obvious from this passage in the disclosure as filed that C<sub>10</sub>-C<sub>20</sub> and C<sub>10</sub>-C<sub>50</sub> are typographical errors and were intended to read C<sub>1</sub>-C<sub>10</sub> and C<sub>1</sub>-C<sub>50</sub>, respectively. A corresponding amendment has been made to the paragraph beginning on page 4, line 8. No new matter is added thereby.

With respect to the rejections based upon the prior art, the Patent Office rejects all claims under 35 U.S.C. § 103 as being unpatentable over the admitted prior art ("APA") in view of U.S. Patent No. 6,436,834 ("Lee") alone or Lee in view of U.S. Patent No. 6,443,811 ("Nojo") or Lee in view of U.S. Patent No. 6,573,186 ("Park") or Lee in view of U.S. Patent No. 6,309,980 ("Tokunaga") or Lee in view of the article written by Wolf. Applicant respectfully submits that the Wolf article was not cited in the PTO-892 and therefore was not readily available to the applicant.

Applicant respectfully submits that all obviousness rejections fail due to a deficiency in the primary reference, Lee. Specifically, Lee does not teach or suggest the alkyl ammonium salt structure, R<sub>(4-n)</sub>H<sub>n</sub>N<sup>+</sup>X<sup>-</sup>, that is required by claim 1. The alkyl ammonium salt structure of claim 1 has a high affinity to an oxide film so that the CMP slurry decreases the polishing speed of the interlayer insulating film due to the cation-anion interaction.

The structure of the alkyl ammonium salt, R<sub>(4-n)</sub>H<sub>n</sub>N<sup>+</sup>X<sup>-</sup>, includes four covalent bonds centered at the nitrogen atom. At least one bond exists between the alkyl groups and the nitrogen atom and the other bonds are provided by the hydrogen atoms.

In stark contrast, the abrasion accelerator of Lee includes an entirely different structure than the alkyl ammonium salt required by amended claim 1. Specifically, the abrasion accelerator of Lee has the following Formula:



where Y and Y are atoms or atomic groups containing lone-pair electrons, such as oxygen atoms, sulfur atoms or NH groups. See Lee at column 4, lines 38-40. Further, R<sub>1</sub> and R<sub>2</sub> are respectively H, C<sub>1</sub>-C<sub>6</sub> alkyl, amino, amino C<sub>1</sub>-C<sub>6</sub> alkyl, or C<sub>1</sub>-C<sub>6</sub> alkoxy. Lee at column 4, lines 40-42.

Since each of X and Y substituents of the Lee abrasion accelerator must include lone-pair electrons, the structure of the Lee abrasion accelerator cannot be the same or similar to that of the alkyl ammonium salt required by claim 1. Therefore, the abrasion accelerator of Lee is different from that required by amended claim 1 and no *prima facie* case of obviousness has been established as no combination of the admitted prior art and Lee teaches or suggests all of the claim limitations of independent claim 1.

Therefore, independent claim 1 is allowable over any hypothetical combination of the admitted prior art and Lee. An early withdrawal of the rejection of claims 1, 9, 10 and 19 as being obvious in view of the admitted prior art and Lee is earnestly solicited.

Because of the deficiencies of Lee, the remaining obviousness rejections are improper as well.

Specifically, the rejection of claims 2-8, 11, 12 and 16 as being obvious in view of the admitted prior art, Lee and Nojo is also improper as Nojo fails entirely to teach or suggest the alkyl ammonium salt required by independent claim 1. Specifically, the salt of Nojo is used as a cationic surfactant to reduce surface defects on a wafer. In contrast, claim 1 requires the alkyl ammonium salt to have a high affinity for an oxide film until the hard mask nitride film is exposed. Thus, claim 1 requires the alkyl ammonium salt to act to control the step difference in the cell and peripheral regions of the wafer being polished. The alkyl

ammonium salts of Nojo are not used for this purpose and there is no suggestion that the cationic surfactants of Nojo could be used for purposes of protecting an oxide film.

Thus, the alkyl ammonium salt disclosed in Nojo has a completely different purpose than the alkyl ammonium salt required by amended claim 1, Nojo does not teach or suggest the use of an alkyl ammonium salt for purposes of providing an additive having a high affinity for oxide films and therefore there is no suggestion in either Lee or Nojo to combine the cationic surfactant of Nojo with the slurry of Lee to provide Lee with a salt having an affinity for oxide films. In fact, Lee teaches away from this as Lee merely teaches an abrasion accelerator and not the use of any salt that has a high affinity to oxide films.

Thus, both Lee and Nojo are concerned with decreasing surface defects. Lee includes an abrasion accelerator having a different structure than that required by amended claim 1. Nojo includes a cationic surfactant, not an alkyl ammonium salt having a high affinity to oxide films. Therefore, no combination of Lee and Nojo, with the admitted prior art, teaches or suggests all of the limitations of amended claim 1. Further, there is no suggestion in either Lee or Nojo to make the proposed combination and, clearly, there is no reasonable expectation of success if such a combination were made as required by MPEP §§ 2142 and 2143.

Next, the office action rejections claims 13 and 15 as being unpatentable in view of the admitted prior art, Lee and Park. Applicant respectfully submits that this rejection is improper for the following reasons. Specifically, Lee and Park are not compatible and cannot be combined to recite the alkyl ammonium salt of independent claim 1. No combination of these two references with the admitted prior art teaches or suggests the alkyl ammonium salt of independent claim 1 and therefore this obviousness rejection is respectfully traversed.

Next, the office action rejections claims 14 and 17 under 35 U.S.C. § 103 as being unpatentable over the admitted prior art, Lee and Tokunaga. However, Tokunaga merely discloses etching processes and cannot supplement the deficiency of Lee and the admitted prior art in terms of their lack of disclosure of the alkyl ammonium salt of independent claim 1. Therefore, no combination of the admitted prior art, Lee and Tokunaga teaches or suggests all of the limitations of independent claim 1 and therefore this obviousness rejection is also respectfully traversed.

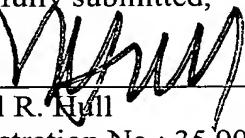
Finally, claim 18 is rejected under 35 U.S.C. § 103 as being unpatentable over the admitted prior art, Lee and Wolf. Wolf is cited for the proposition that it discloses certain etching gases. However, Wolf does not teach or suggest the alkyl ammonium salt of independent claim 1 and neither does Lee or the admitted prior art. Therefore, because no combination of these three references teaches or suggests the alkyl ammonium salt of independent claim 1, this obviousness rejection is also respectfully traversed.

With all rejections having been addressed and traversed, applicant respectfully submits that this application is in a condition for allowance and an early action so indicating is respectfully requested.

The Commissioner is authorized to charge any fee deficiency required by this paper, or credit any overpayment, to Deposit Account No. 13-2855.

Dated: November 8, 2004

Respectfully submitted,

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